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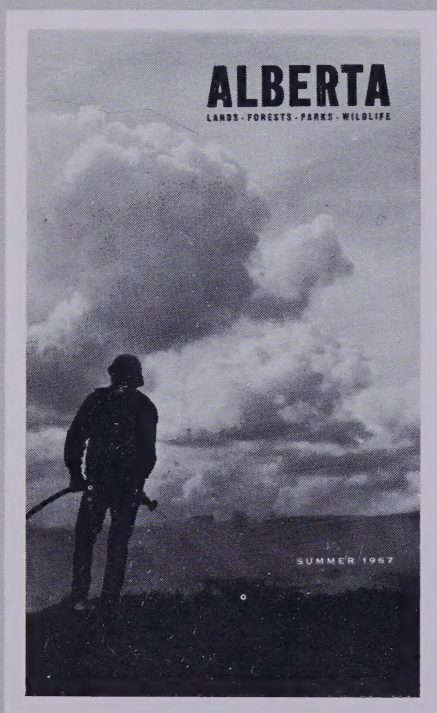
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NATURAL RESOURCES; ITS
LAND, FORESTS, PARKS AND
WILDLIFE.

ABOUT OUR COVER



A member of a crack native crew putting out a brush fire in the Whitecourt area. The fire was part of a scene for the Alberta Forest Service's film "Right to Burn". The film is expected to be completed this fall and distributed next year.

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Hon. HENRY A. RUSTE,
Minister

V. A. WOOD,
Deputy Minister

ALBERTA'S Fabulous Fishing

By Martin Paetz,
Chief Fishery Biologist

The Province of Alberta comprises a land mass of about 255,285 square miles lying immediately east of the Continental Divide. From this divide the province slopes in easterly and north-easterly directions, from altitudes of nearly 13,000 feet to 2,100 feet at its eastern boundary and 500 feet at its northern boundary. Located within the provincial boundaries are 6,485 square miles of permanent lakes and between 12,000 and 13,000 linear miles of streams. The lakes vary in size from several acres to over 800 square miles and vary in nature from the deep, cold types found in mountainous regions to the expansive, productive bodies of water of the prairies. The streams are divided into seven drainage systems, five of which have their headwaters in the steep slopes of the Rocky Mountains. It has been calculated that about 40 per cent of the total stream mileage (5,000 - 6,000 miles) is capable of supporting such coldwater species as trout, Mountain Whitefish and Arctic Grayling, while the remaining 60 per cent may be classified as warmwater fish habitat frequented by Northern Pike, Walleye, Goldeye, Sauger and numerous non-game species.

The lakes of Alberta support a commercial fishing industry as well as pro-



viding tremendous recreational opportunities for the province's 140,000 licensed anglers.

Sport fishermen in Alberta are able to pursue their quarry on a year-round basis except in certain trout streams where closure on alternate years is effected to provide for adequate natural reproduction. Traditional "fishing seasons", extending from May

or June until September, were abandoned on all game species early in the 1950's, thereby increasing the recreational opportunities provided by the many streams and lakes in the province. While the more accessible trout streams on the east slopes of the Rockies are quite heavily fished, some of the head-water streams of the Peace River and Athabasca River systems still offer virgin fishing conditions for native char, trout and Arctic Grayling. In addition, many lakes in the northeastern regions of the province have a much greater angling potential for pike, walleye and perch than is now being utilized.

An important addition to the sport fishery has developed as a result of the stocking of a large number of pothole-type lakes with fast-growing strains of Rainbow Trout. These lakes, generally under two hundred surface acres in area, are scattered throughout the prairie, parkland and foothill regions. They are readily accessible to anglers from urban centers. For the most part they have no well-defined inlet or outlet streams, and are often in sheltered locations — factors which sometimes combine to make them susceptible to winter-kill. Their waters teem with the smaller aquatic forms of life but usually do not contain fish other than a few minnow species and Sticklebacks. The first experimental introductions of Rainbow Trout in these lakes were made in 1949, and the outstanding fisheries which resulted led to rapid expansion of "pothole-lake" investigation and stocking program. The growth rate of trout in these lakes is so rapid (up to 5 pounds in 2 years) that anglers have difficulty in securing an adequate harvest before the trout become large and difficult to catch. The lack of permanent inlet streams or suitable beach spawning sites prevents natural reproduction of trout. Fisheries, therefore, must be maintained by stocking with hatchery fish. This use of the hatchery product has produced gratifying results, especially to anglers who otherwise would have to travel many miles to the waters of the mountains and foothills for their trout fishing.

Fisheries Research and Management

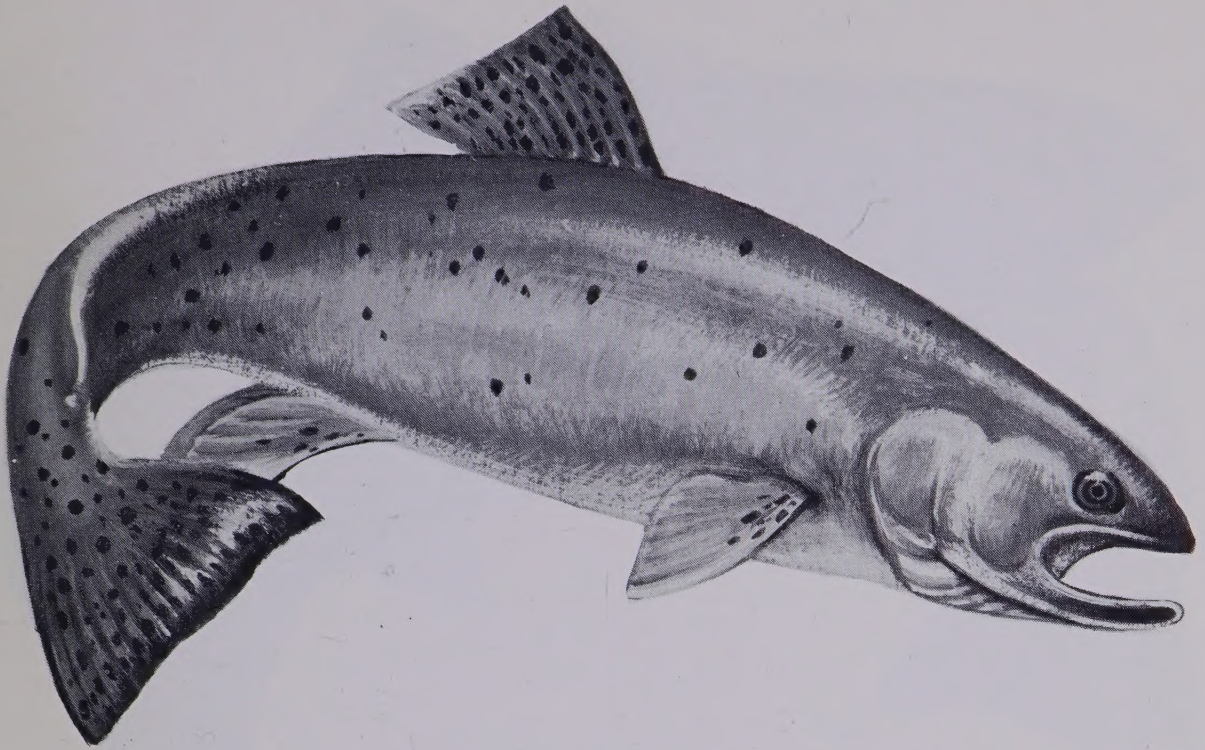
Fisheries research in Alberta was initiated by the late Dr. R. B. Miller of the Zoology Department, University of Alberta, in 1940. The first area of investigation was the life cycle of the pike-whitefish tapeworm, *triaenophorus crassus*. The presence of this parasite in fish flesh posed one of the major problems of inland commercial fisheries.

Research in sport fisheries has been carried out since 1946. This began with basic surveys on trout streams of the eastern slopes and on many of the smaller lakes throughout the province. A number of significant facts concerning streams and their fish populations were brought to light through these surveys, and major changes in stream-management policies were effected. In order that fishery research pertaining to streams might be carried out more efficiently, the Alberta Biological Station was established at Gorge Creek, Southwest of Calgary, in 1950. Various studies have been carried out at this station, but much of the work has been centered around the survival of hatchery trout in streams and the causes of mortality in stream-stocked trout. The homing behavior of stream trout, the effects of stocking densities on survival of the trout, and parasite studies are some additional research projects being conducted at the Alberta Biological Station.

Much investigational work which does not belong in the category of basic research is also being conducted in the province. This includes inventories of lakes and streams, sampling fish populations to determine growth rates and species distribution, conducting creel census to determine rate of harvest, observations on winter-kill and many similar projects. Data are accumulated which are useful in modifying management practices, as well as serving as a basis for future study.

Types of "sporting fish" available in the province are described on the following pages.

Credit — McClane's Standard Fishing Encyclopedia.



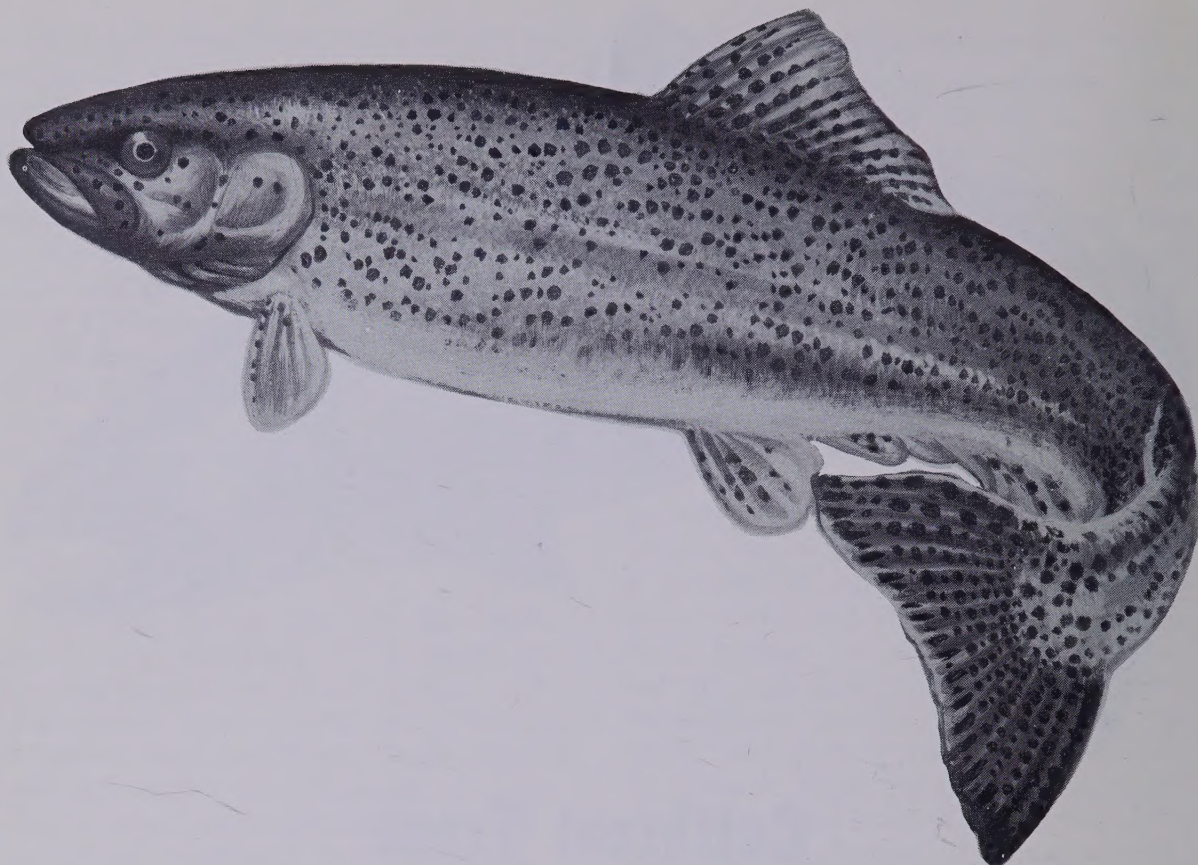
Cutthroat Trout

The Cutthroat Trout is native to headwater lakes and streams from the International Boundary northward to and including the Bow River system. This species has supplied a great deal of the stream-trout fishing in Alberta in the past, but unfortunately few pure strains of native cutthroat remain due to hybridization with Rainbow Trout which were extensively stocked in cutthroat waters between 1930 and 1950. To preserve cutthroat fishing, this species was introduced into the Ram River in the North Saskatchewan drainage in 1955. This river contained no other trout due to several impassable falls and its relative inaccessibility to man. The introduction was a decided success, and the Ram River system is now providing fine cutthroat fishing. Other streams in the southwestern part of the province which have remained essentially cutthroat streams are the west and south branches of the Castle River, Daisy Creek, Vicary Creek, Dutch Creek, Racehorse Creek, and the north-west branch of the Oldman River and the Livingstone River.

The native cutthroat of the province is often more colorfully marked than the species tends to be near the southern parts of its range. The black spotting is somewhat more profuse, and the red-orange streaks beneath the lower jaw are very distinct. It is not generally considered a difficult fish to catch, and takes wet or dry flies readily from May through October.

Angling Techniques — The cutthroat is not considered as active a gamefish as the rainbow or brown. It seldom jumps when hooked. However, it is an excellent quarry in its native habitat, being both beautiful and shy. Cutthroat rise freely to the dry fly and often require fine leaders and small patterns for successful angling. These trout are also taken on nymphs, wet flies, buck-tails, spinners, spoons and worms. The cutthroat usually shows a preference for flies that imitate shrimp or local forage fish. Medium weight spinning tackle (6-pound test) is very suitable for this kind of angling.

The cutthroat is an excellent table fish. The flesh may vary from white



Rainbow Trout

to red and is of fine flavor. This trout can be prepared in a variety of ways including frying, broiling, baking and smoking.

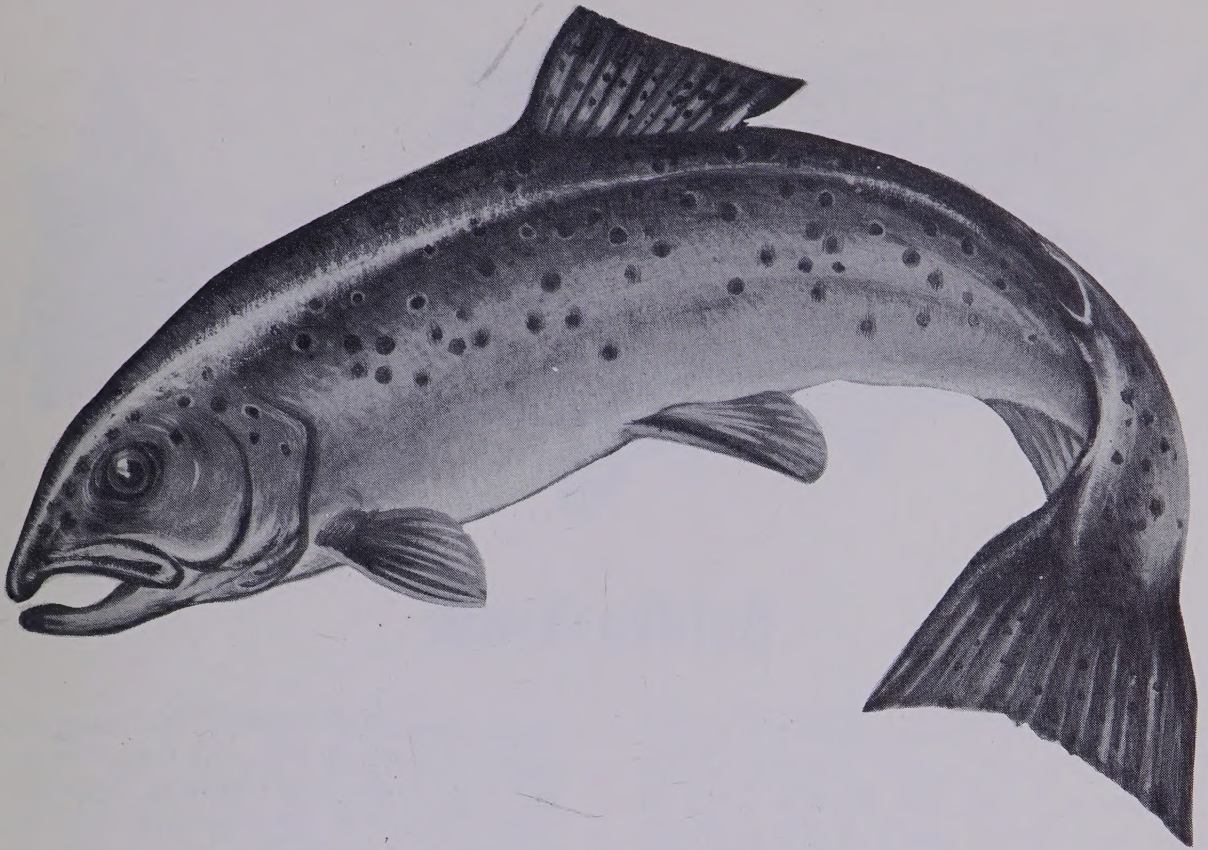
RAINBOW TROUT

The rainbow is probably the best-known and most widely publicized of the trout group in Alberta. As in other areas of the continent, it has received a great deal of attention in fish-culture work due primarily to the ease with which it can be raised in hatcheries and its ready acceptance by the angling public. A fact that is not well-known, however, is that Rainbow Trout are native to the Athabasca River system in Alberta from headwater streams near the Jasper Park boundary to the south slopes of the Swan Hills. Many "old-time" fishermen attest to good catches of rainbows from streams of the Athabasca system years before fish-cultural activities and introductions were carried on in this province.

As previously mentioned, rainbows have provided excellent fishing in pot-

hole lakes and reservoirs in which they have been stocked. Among those which have become well known are Strubel Lake, Mitchell Lake, Star Lake, Chickako Lake, Two Lakes, Reesor Lake, Beauvais Lake, Wildhorse Lake, Beaverdam Lake, Police Lake, and, more recently, Henderson Lake, Tyrrell Lake, and Schuman Lake have been added to the list of popular rainbow trout waters. The rehabilitation of selected small lakes which have contained undesirable species or species incompatible with trout introductions is gradually increasing the number of lakes being managed for rainbow fishing.

The best stream fishing for Rainbow Trout in Alberta is to be found in the Bow River for approximately twenty-five miles downstream from the city of Calgary and in the Oldman River as it winds through the foothills northwest of the town of Pincher Creek. The Bow River, throughout the aforementioned stretch, is probably one of the most productive trout streams on the



Brown Trout

continent, and catches of rainbows varying from two to six pounds are not uncommon. Trout of this size, taken on light tackle in this swiftly flowing river, provide excellent sport.

Angling Techniques — There are as many ways to catch Rainbow Trout as we have fishing methods. Broadly speaking, rainbows are taken on all kinds of lures and baits from trolling spoons to frozen lumps of vaseline. However, many methods are only of local importance, and the majority of anglers seeking the rainbow use either fly-casting or spinning equipment. The exceptions may be distinguished by the habitat and food of the trout. Fly-fishing in lakes, for example, is usually more productive in habitats where insects are the dominant food item.

Perhaps the chief difference between the Rainbow Trout and the other common species is because it is pre-eminently a fastwater fish. Rainbows favor the swift runs and riffles of large streams, and a practiced technique is

required to take them consistently. In the very best water, Rainbow Trout can be found feeding wherever the current will bring them nymphs and duns. As evening approaches, the fish move around more freely, and one can take rainbows ranging 10-18 inches long without covering too much water. The trout jump and hang in the current shaking your wrist, and now and again you meet an old bruiser who demands a bit more skill in placing the fly right.

BROWN TROUT

The introduction of the Brown Trout into a number of streams on the eastern fringe of the foothills has given great satisfaction to those fly-fishermen who choose to pit their skill against this wariest member of the trout clan. The Brown Trout has been most successful in streams with gentle flow rates, moderately cool temperatures, and abundant cover in the form of overhanging banks, sunken logs, and tangles of tree roots. These favorable environments are provided by streams such as the Raven



Golden Trout

River, Beaver Creek, Stauffer Creek, Fallen Timber Creek, Alford Creek, Dogpound Creek, and Shunda Creek in the west-central parts of the province. Recent introductions in selected streams of the Athabasca River, Peace River, and Waterton River systems have been made with a view to extending the range of this desirable species.

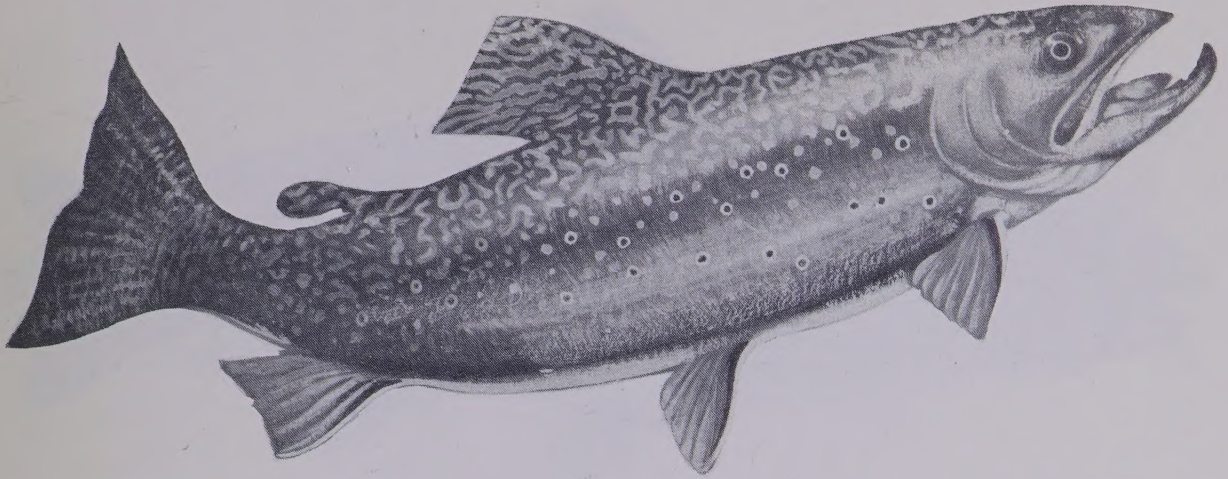
Brown Trout may be taken by those skilled in the art of fly-casting on either wet or dry flies especially during late evenings in the months of July and August.

Angling Techniques — The Brown Trout feeds on both aquatic and terrestrial insects. It also eats mollusks, crayfish and other fish. Large trout will occasionally feed on frogs, birds, mice and other small mammals, however, these food forms are not part of its normal diet. The Brown Trout forages freely on the surface when mayflies, caddisflies and stoneflies are emerging and thus become significant for the fly-fisherman. It is very active at night, and some of the largest Brown Trout are caught after dark, particularly in the summer months.

The brown is acknowledged as the most difficult trout to take on the fly. It is the quarry of the experienced angler who seeks the species with dry flies. Owing to the fact that Brown

Trout commonly feed in the relatively quiet pools and runs of clear rivers and are inherently cautious, the fly-fisher must be skillful and gain an understanding of the trout before he can catch the brown with any consistency.

On visible rises, the dry fly is presented to the fish, which may of course take fright at once and rush off to its shelter; short of this the trout may drop slowly downstream to inspect a drifting fly before quietly going away. Or it may just sink to the bottom and cease feeding. However, if the trout ignores the fly and makes no movement away from it, or makes some movement toward it, the fish is a worth-while target. Generally, "low-impact" dressings, such as the variants and spider-type dry flies, or sparsely dressed winged patterns which drop to the surface without creating a disturbance are most effective. On flatwater or slick water the fly must float upright, buoyantly, as if it were unattached to a comparatively heavy line just a few yards away. Some of the most famous Brown Trout fly patterns are the Quill Gordon, March Brown, Blue Dun Spider, Cream Variant, Hendrickson, Adams, Royal Coachman and the Light Cahill and Dark Cahill; these dressings will take brook and Rainbow Trout as well, but they are especially effective on browns.



Brook Trout

GOLDEN TROUT

This colorful native of the Sierra Mountain Region was introduced to three alpine lakes southwest of Pincher Creek in 1959. Several additional introductions have followed. Most of these waters have been closed to angling pending the establishment of the species. The results thus far are encouraging as specimens in the 1½-pound range have been secured from South Fork Lakes for artificial spawn-taking. It is expected that within a few years a limited fishery for Golden Trout will be available in the province.

Angling Techniques — Goldens differ from the common species of trout in being limited to high-altitude lakes and streams and consequently the techniques of fishing them are more specialized. Although the trout are caught on spoons and spinners as well as baits such as worms, salmon eggs and grubs their natural forage consists principally of small insects. Small crustaceans are also of varying importance, as are terrestrial insects. The fly-fisherman, however, ordinarily achieves good results with flies dressed on hooks from No. 12 to No. 20. Dry flies work quite well when the fish are visibly rising, and small bucktails or streamers are effective occasionally. Nymphs on No. 14 or No. 16 hooks which imitate caddis larvae are regularly successful.

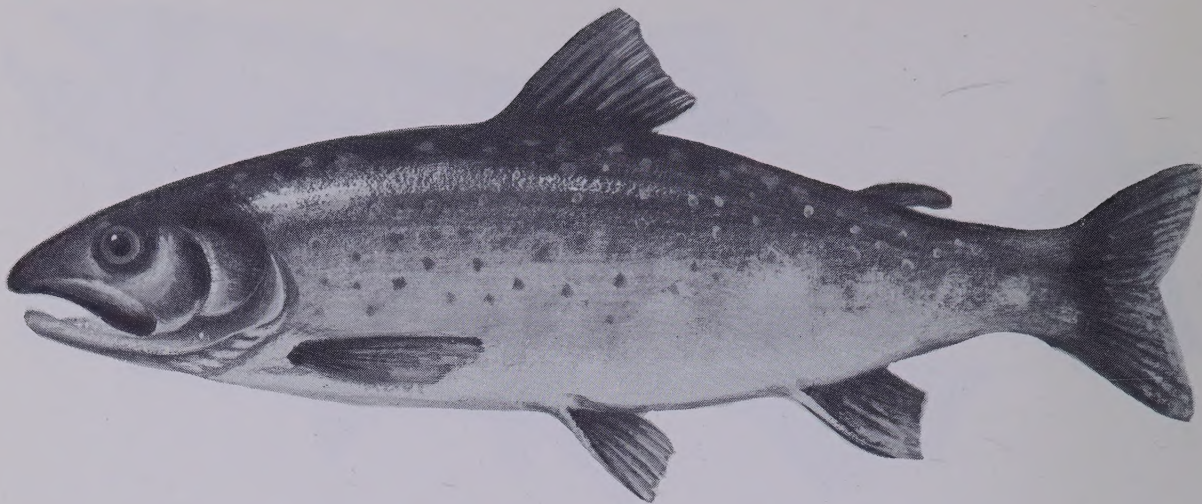
The Golden Trout is a prime food

fish. The flesh is firm and finely textured but slightly oilier than other trout. It can be prepared in a variety of ways, but is most often pan fried by the waterside. Goldens do not keep well and care must be taken if the fish are to be packed out from remote lakes. It is an excellent fish when smoked.

BROOK TROUT

This members of the char group was generously stocked in streams and lakes during the early history of fish culture in Alberta. It has become very abundant in a number of small tributary streams, particularly those on which beaver impoundments occur. Attempts to establish the species in some cutthroat waters met with only limited success. The Brook Trout has, however, been a welcome addition to the sport fishery in waters where spawning conditions are not favorable for other trout species. Streams which have consistently provided good Brook Trout fishing are the north and south forks of Prairie Creek, Upper Stony Creek, Williams Creek, Alford Creek, and Lookout Creek. A number of lakes also have become well-known as Brook Trout producers. They are Bovin (Blue) Lake, Elbow Lake, Rat Lake, and Muskiki Lake, the latter having yielded specimens up to seven pounds.

Angling Techniques — Brook Trout are caught with spinning lures, and by



Dolly Varden

trolling and even plug-casting according to local conditions. However, they are mainly a fly-fisher's quarry. Brook Trout feed on insects, crustaceans, mollusks, and fish. They occasionally forage on leeches and on shrews and other mammals. Contrary to a widely accepted belief that the "brookie" is more of a sub-surface feeder than other trout, it rises readily to the dry fly under the proper conditions when water temperatures are cool and bug life is on the move. The safe rule is to "match the hatch". At other times a wet fly or nymph will score nicely, and in this respect don't neglect trying both dark and bright patterns; "squaretails" often favor the extremes in flies such as the Black Gnat, Black Moose, Conrad, Royal Coachman, Silver Doctor, Parmachenee Belle and Montreal. For strictly trophy "squaretails", don't miss trying big, rough-looking wet flies such as the Burlap, Fledermaus, or Silver Shrimp on No. 2 to No. 6 hooks. The latter are often better than streamer flies.

DOLLY VARDEN

Dolly Varden are common in head-water streams and lakes from the Peace River to the southern extremities of the South Saskatchewan River system. Although they provide many hours of recreational fishing, they are not regarded as highly by anglers as the other trout

species. Dolly Varden are taken through a wide range of sizes — from specimens of a few ounces in weight in tiny head-water tributaries to large fish of fifteen pounds or more in the larger rivers. In some of the more inaccessible areas of the province, the Dolly Varden is the only member of the trout group present in the streams. The Berland River, Wildhay River, Muskeg River, and Cardinal River are some of the more popular producers of large Dolly Varden.

Angling Techniques — The Dolly Varden is closely related to the Arctic Char and is considered by some to be only a sub-species. The young feed largely on insects, but older fish include fish in their diet. The angler has mixed emotions about the Dolly. In cold, head-water streams it is welcome in the creel. In lakes it is condemned or bragged about, dependent upon the feelings of the fisherman.

LAKE TROUT

Lake Trout are somewhat sparsely distributed in the province due to the shallow nature of most of our lakes. They are most abundant in the extreme northeastern section in the deep, cold lakes of the Precambrian Shield. These lakes are accessible only by air at the present time so that the sport fishery is in a relatively undeveloped state. Other waters in the province which pro-



Lake Trout

vide Lake Trout fishing are Cold Lake, Grist Lake, Namur Lake, Margaret Lake, Wentzel Lake, Peerless Lake, Swan Lake and Rock Lake. Lake Trout introductions into two hydro impoundments, Spray Reservoir and Ghost Reservoir, have been successful, and moderately good fisheries have developed in these reservoirs.

Angling Techniques — Fishing for this species is most rewarding immediately after spring break-up and again in the fall when the fish are found in relatively shallow water. The Lake Trout is a popular gamefish, and it may be taken by fly-casting, spinning, or bait-casting when it is found inshore. Streamer flies, spoons, spinners and plugs are effective lures. However, the most common method is by trolling with large spoons. Lake Trout are extremely sensitive to water temperature and some local knowledge of the area being fished is a great advantage. An excellent food fish it is prepared in a variety of ways such as stuffed and baked, steaked, broiled and smoked.

ARCTIC GRAYLING

This fine gamefish is found mainly in streams of the Athabasca River and Peace River drainages. Many of the tributary waters of the middle and lower reaches of the Athabasca River, as well as the headwaters of the Wapiti and

Smoky rivers, have grayling populations which have rarely been fished by man. Recent road-building programs are, however, creating access to these areas, and in a short time much of this water will provide a sport fishery for one of Canada's best native gamefish. Although the grayling is typically found in the riffle or rapid portions of streams, the species has been introduced into a limited number of pothole-type lakes with fair to excellent success. In either situation, grayling from the $\frac{3}{4}$ - 3-pound class are a dry-fly fisherman's delight.

A number of the more popular waters for grayling fishing are the Swan River, Freeman River, Wapiti River, Kakwa River, Cutbank River, certain portions of the McLeod River, Berland River, Marten River, Christina River, Christmas Creek, Two Creek, Marsh Head Creek, Pinto Creek, Pembina River, Trout Creek, Sunday Creek, and Kinky Lake.

Angling Techniques — As a rule grayling prefer dark flies in black, gray or brown. Some good patterns are the Black Gnat, March Brown, Black Ant, Gray Hackle, Brown Hackle, Stone Fly, Quill Gordon and Dark Cahill on Nos. 10, 12 and 14 hooks. Grayling are also easily caught on a large variety of spinning lures but $\frac{1}{8}$ to $\frac{1}{4}$ ounce wobbling spoons and $\frac{1}{16}$ to $\frac{1}{4}$ ounce spinners in brass, gold, silver and red-



Arctic Grayling

and-white finishes are the most popular baits. The angling techniques are basically the same as those used for trout. Arctic Grayling are an excellent food fish and may be prepared in a variety of ways. The flesh is firm and white with a very delicate flavor.

MOUNTAIN WHITEFISH

Mountain Whitefish are among the most numerous of the coldwater gamefish in the province, being widely distributed throughout the upper and middle reaches of all the major river systems. They are generally not resident in the smaller tributary streams on the east slopes of the Rockies, apparently preferring the larger creeks and rivers. They also inhabit a considerable number of mountain lakes and the hydro impoundments of the Bow River system.

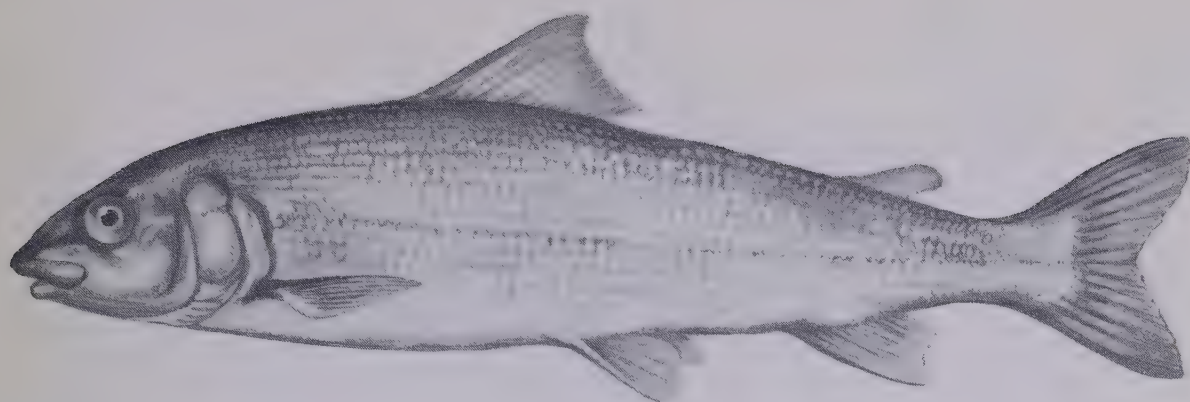
Mountain Whitefish are often erroneously referred to as "grayling" in Alberta, especially in areas where Arctic Grayling do not occur. They may, however, be easily distinguished from the latter species by their much smaller

mouth and smaller dorsal fin, as well as by the lack of dark spots on the anterior portions of the body.

As a gamefish, the species is generally considered by anglers to be somewhat inferior to the trouts, chars, and Arctic Grayling, but in spite of this many fishermen-hours are spent annually in pursuit of this fish, and its contribution to the over-all sport fishery resource of the province is quite substantial.

The Castle River, Crowsnest River, Oldman River, Highwood River, Upper Bow River, Red Deer River, and Athabasca River are choice streams for Mountain Whitefish.

Angling Techniques — These fish are most often taken by using small morsels of bait on the hooks of artificial flies, but wet flies fished near the stream bottom are also very effective. While the average catch may consist of fish slightly under 1 pound, specimens up to 2 pounds are not uncommon, and fish of 5 pounds have been recorded from Alberta waters.



Mountain Whitefish

LAKE WHITEFISH

The Lake Whitefish has until very recently been considered exclusively a commercial species in Alberta. However, anglers have now begun to realize its potential as a gamefish and have developed methods of taking this species with hook and line, especially during the winter months. During the past two years Lake Wabamun has developed a flourishing sport fishery for Lake Whitefish. Several hundreds of anglers frequently have taken part in this fishery on weekends. Other waters which are beginning to attract whitefish anglers are Pigeon Lake, Hanmore Lake, Buck Lake, and Moose Lake.

NORTHERN PIKE

Northern Pike are the most abundant and widely distributed of the province's warmwater gamefish. They occur in streams, lakes, and reservoirs throughout the prairies and forested regions, but rarely in mountain waters. Undoubtedly Alberta anglers take more pike than any other species because of the accessibility of pike waters and the relative ease with which this fish can be caught. There is a growing interest in trophy-sized pike and a considerable number between 20 and 35 pounds have been reported in recent years. Seibert Lake, near Lac la Biche, has been famous over the years for its large pike with 15-25 pounders commonly being taken. A brief list of other

lakes which support major pike fisheries would include Pinehurst Lake, Moose Lake, Fort Lake, Skeleton Lake, Lac la Biche, Beaver Lake, Calling Lake, Cold Lake, Sturgeon Lake, Winagami Lake, Lac la Nonne, Buck Lake, Chestermere Lake, Lake Newell, Lake McGregor, Park Lake, Keho Lake, and St. Mary's Reservoir.

Angling Techniques — The Northern Pike is one of the most reliable gamefish, but there are times when it is more readily caught than others. Pike feed entirely in the daylight this is why morning is considered one of the better fishing periods as pike taken in the morning tend to have empty stomachs from the previous night's digestion. After the water temperature reaches 65 degrees angling success lessens and the summer catches diminish. The most consistent catches of Northern Pike are made in shallow water by fishing holes in weed beds and patches of lily pads. In the spring pike concentrate in large numbers in moderate to strong currents on the downstream side of barriers or falls. Fish usually bite readily in these areas and large catches often result. Medium and shallow-running lures and large lively bait are most generally used and are the most productive. A tabulation of artificial baits indicates that so many kinds were used that there are no significant differences in their ability to catch fish.



Lake Whitefish

WALLEYE

This member of the perch family is the most prized of our warmwater gamefishes because of its excellent table qualities. While not as widely distributed as the pike, the province has a good number of lakes and large rivers which provide Walleye fishing. Walleye tend to be localized in distribution within a given lake or stream, showing a preference for rocky or sandy bars. Anglers have found it advantageous to locate these areas when fishing for this species.

The better-known lakes for Walleyes are Fawcett Lake, Sturgeon Lake, Smoke Lake, Wolf Lake, Moose Lake, Helena Lake, Elinor Lake, Seibert Lake, Ironwood Lake, Touchwood Lake, Baptiste Lake, and Buck Lake. The lower regions of the large rivers also yield excellent catches of Walleyes. The Athabasca, Peace, Pembina, Beaver, Red Deer, and South Saskatchewan rivers contribute significantly to the Walleye sport fishery. Six-to-8-pound fish of this species are not uncommon in the Red Deer and South Saskatchewan rivers, and specimens up to 12 and 14 pounds have been taken in the Athabasca and Pembina rivers.

The Sauger, a close relative of the Walleye, is also taken in rivers of the Saskatchewan drainage system. Most anglers do not distinguish between the

two species so that the Sauger is more often than not thought to be a Walleye. Owing to its restricted distribution and small size, the Sauger does not assume a position of importance in the province's sport fishery.

Angling Techniques — It is questionable whether any species has greater angling value than does the Walleye. Wherever it is found in abundance it is the primary target of most anglers. Walleyes bite readily, are generally concentrated in schools, put up a dogged fight when hooked, attain a large size, and unexcelled in eating qualities. Although many techniques have been developed to catch them, there are only a few basic facts which must be retained by the successful angler. (1) Walleyes tend to congregate in schools; when you catch one it is likely that there are others in the same spot or vicinity. (2) Except on rare occasions Walleyes are found on the bottom of the lake or river, so the odds are with you if you keep your bait on or very near the bottom. (3) The primary food of Walleyes is fish, and your bait should be, or closely resemble a live fish. (4) Walleyes usually are found near or on a sandbar or other physical feature which provides a good feeding area in close proximity to deeper waters. (5) Walleyes usually are slow and methodical in taking food. Keep your bait still, or



Northern Pike

preferably, moving very slowly and give the Walleye plenty of time to look it over. (6) Walleyes feed primarily during the evening and night hours so you can expect the best results after the sun goes down.

YELLOW PERCH

This colorful little panfish is almost as widely distributed as the Northern Pike and frequents essentially the same habitat in lakes. It is not, however, a fish of the flowing waters of the province. In many lakes perch are so prolific and underharvested that populations have become stunted. Lakes which are noteworthy for their large perch are Sturgeon Lake, Kehiwin Lake, Moose Lake, Beaver Lake, and Elkwater Lake. Perch of two pounds are not unusual in Beaver Lake.

Angling Techniques — It is unlikely that one can overestimate the angling value of the Yellow Perch. Wherever the perch is found it provides hours of fun and pounds of delicious food for fishermen of all types and angling proficiency in all seasons of the year. Whether fishing from shore or a dock with a handline and a worm or from a boat with a trolling rig and a minnow

lure, the perch will provide fast action. Not renowned for its fighting qualities, the perch makes up for this in numbers and appetite. Almost any natural bait will be accepted by a hungry perch, and even some of the artificial lures, especially flies and small spinners. Perch usually bite best during the daylight hours, especially around noon and again toward evening. The bait should be fished a foot or two off the bottom.

GOLDEYE

The Goldeye is probably the best of the province's warmwater gamefish as far as sporting qualities are concerned. It is not unusual for this fish to leap out of the lake in trout-like fashion when hooked on light tackle.

The distribution of the Goldeye is limited to the warm, silty sections of the large rivers, such as the lower Peace River, Athabasca River, North and South Saskatchewan Rivers, and Red Deer River. Its occurrence in lakes is limited to Lake Claire, in Wood Buffalo Park, and Lake Athabasca where it is taken for commercial purposes but not as a gamefish.

Angling Techniques — Unlike most fish, they do not spawn every year after



Walleye

reaching sexual maturity. A certain proportion of any population will drop their eggs on gravelbars and sometimes between May and July, but the rest of the Goldeyes stubbornly carry immature eggs. Being insect-eating in feeding habits, the Goldeye provides excellent fly-fishing and like its less distinguished

cousin the Mooneye, it will hit floating patterns with reckless abandon. They usually average less than a pound or 12 inches in length, but 2 pounders (16 inches) are not uncommon. In the streams previously mentioned, Goldeye are taken on wet flies, small spinners, and natural bait.



Yellow Perch



Goldeye



Sauger

Trout Stream Problems

By Gordon Haugen

Fisheries Biologist

Fish and Wildlife Division

Sport fishery management, and in particular management of trout streams, is based on a number of biological principles. These principles, when applied, are often complicated by environmental factors such as weather, soil type and topography. However, man and his treatment of the environment has, and is, continuing to be the largest factor that has complicated the application of our stream management program. While the natural factors are not constant, their effect in the environment is gradual. Man's treatment of the environment is not constant and if improper, can have devastating and permanent effects on the environment and its associated resources, such as the sport fishery resource.

We know that it takes a combination of physical and chemical characteristics which we term "habitat" to produce trout in sufficient numbers to provide the public with a high quality sport fishery resource. Here in Alberta, along the east slopes of the Rocky Mountains, we have numerous water courses varying in size and quality. We have, for management purposes, classified these water courses into three categories: intermittent streams, secondary streams and major rivers. Intermittent streams are those which flow only in periods of spring runoff and high precipitation and as such do not support a sport fishery. However, it must be

emphasized that the intermittent stream is very important in the overall make-up of our watersheds and their discharge patterns. Intermittent streams combine to form what we have termed the secondary streams. Secondary streams maintain year-round flows and for the most part do not exceed the discharge of more than 200 cubic feet per second during peak flows. Alford Creek, Dogpound Creek, Wampus Creek and Raven River are examples of secondary streams. Secondary streams combine to form a major river classification. The Red Deer River, Athabasca River and North and South Saskatchewan Rivers are examples of major rivers. These water courses, due to the high fluctuating flows, braided and scoured channels and lack of immediate bank cover are not considered as productive as secondary streams. Therefore, we consider the secondary streams as the most productive, as well as capable, of supporting the greatest angling pressure, if properly managed. Productive secondary streams are characterized by physical habitat features such as bank cover (trees, shrubs, and grasses), undercut banks, clean water which flows year-round, and an interspersed of pools, runs and riffles. Bank cover is the most important as it controls the shape of the stream channel and determines water quality as well as providing escape cover. These streams have, or have had, the necessary habitat to produce good trout populations.

In subsequent paragraphs we shall examine the various ways in which man has altered our stream environment.



A Good Trout Stream

A. Habitat Destruction

When habitat is destroyed or altered, drastic changes in trout populations will occur. As an example, let us refer to a study by Bill Alvord and John Peters, who selected 13 trout streams in Montana where large amounts of habitat destruction had occurred. Fish population estimates made by electro-fishing indicated that in the portions where the habitat had been destroyed or altered by man's activities, trout populations had been greatly reduced, compared to those sections in which the habitat was left in its natural conditions. On the altered sections, 387 trout were recorded compared to 1,000 on the sections which had not undergone physical habitat destruction or alteration. Here in Alberta, habitat destruction is occurring at a very rapid rate. Agriculture, road construction, logging and mineral exploration have created the greatest losses to trout stream

habitat. In agricultural areas large sections of land have been cleared and in many cases the clearing has occurred down to the waters edge. Situations such as these have created conditions favorable for stream bank erosion. When stream bank erosion occurs, large amounts of silt are carried into the stream. Further studies by Don Bianchi and John Peters determined the relationship between silt and trout on a study conducted on Blue Water Creek, Montana. Blue Water Creek is a small trout stream about 15 miles in length and varies in width from nine to sixteen feet. The study directly measured the stream flows, suspended sediments, trout populations and fish food organisms. The upper portion of Blue Water Creek was characterized by a meandering stream channel lined by dense vegetation. The ratio of pools, riffles and runs was favorable for trout. The stream bed had clean gravel which provided

good spawning areas. The lower portion of the creek had undergone varied degrees of habitat alteration and was characterized by much wider stream channels, very little bank vegetation and stream bed covered by silt. Agriculture activities were responsible for the habitat destruction. Results of the investigation indicated that in the upper portion where natural habitat occurred, a yearly average sediment load of one-half ton per day was recorded. A yearly average sediment load of 30 tons per day was recorded on the lower portion where habitat destruction had occurred. Electro-fishing indicated that the upper sections where good habitat was present produced 96 trout out of each 100 fish sampled, compared to only six trout out of every 100 fish sampled in the lower sections. The fish samples included Brown and Rainbow Trout, suckers and various species of minnows. Fish food organisms were also affected by habitat destruction. The mortality of eyed trout

eggs was only six per cent in the upper sections as compared to 100 per cent in the lower section. The study, therefore, leaves no doubt that silt affects the trout numbers, fish food organisms and trout reproductive capabilities.

Here in Alberta, similar studies have been initiated in recent years such as the Tri-Creek Fisheries Watershed Investigation which is designed to measure the effects of pulpwood extraction on three small trout streams in the McLeod River drainage basin. The investigation includes the monitoring of the physical, chemical and biological characteristics of the three streams.

B. Chemical Pollution

It was stated earlier that trout require clean water not just during short periods throughout the year. The term "clean water" means very simply, water that is not polluted.

Poor Habit — Poor Trout Stream



In the process of developing the mineral resources of our province we have caused pollutants of various quantities and complexities to enter our water courses. Contamination by our oil industry is one example. In the recovery of gas and oil, many conditions have been created which have destroyed the potential of the trout stream resource. In many areas along the east slopes of the Rockies as well as in the Swan Hills, oil and oily refuse have been permitted to escape into streams and rivers sometimes as a result of carelessness.

Studies in California found that oily substances are harmful to freshwater aquatic life in the following manners:

1. Free oil and emulsions may act on the exterior surfaces of fish, i.e. they adhere to the gills and interfere with respiration. Within limits, however, fish have a defensive mechanism to combat such action. They can secrete a mucous film to wash away irritants. If the concentration of oil is too heavy, oil will accumulate on the gills and cause suffocation.

2. Free oil and emulsions may coat and destroy algae and other plankton, thereby removing a source of fish food. The coated organisms may adhere to suspended solids and settle to the bottom of the stream.

3. Settleable oily substances may coat the bottom, destroy bottom dwelling organisms and interfere with spawning areas.

4. Soluble and emulsified material, ingested by fish, taint the flavour of the flesh.

5. Organic materials may use up oxygen in sufficient quantities to kill fish.

6. Heavy coatings of free oil on the surface may interfere with the natural processes of reaeration and photosynthesis. Very light coatings would not be detrimental in this respect, however, for wave action and other turbulence would maintain adequate reaeration.

7. Water-soluble materials may exert a direct toxic action on fish or fish-food organisms. Such toxicity may

be acute or chronic. Acute toxicity will produce death in 96 hours or less. Chronic toxicity exerts a long-time effect, through an accumulative action or through subtle changes in the ecology. By its very nature, chronic toxicity is difficult to detect and generally even more difficult to prove.

In an example where a polluted stream was examined in the summer of 1965, it was indicated that a large degree of contamination occurred (Figure 3). Water samples indicated a varying degree of contamination. Monitoring carried out throughout the summer indicated a complete disappearance of fish food organisms below the point of contamination. Fish taken below the point of contamination were highly tainted and undesirable for the table. Other streams have been known to receive a similar degree of pollution but they were not examined to the same extent as Pine Creek. Pine Creek was selected as a test stream and it points out the obvious effects oil pollution will have on our natural free-flowing waters.


In summary, it is clear that if we allow large amounts of habitat destruction as well as chemical pollution to occur in the province and especially along the east slopes of the Rockies, we are going to experience problems similar to those found in many areas of the United States as well as Eastern Canada. The term "multiple use" is one that should be applied to the area. However, in many cases the term "multiple mis-use" would be better terminology. Economically, we must consider a trout stream as a self-sustaining, long-term capital investment. Sports fishermen in Canada in 1961 spent over \$173,000,000.00 on pursuing this sport. A good proportion of this sum was spent by those who angled in trout streams. This money can be thought of as interest on our capital investment. Our capital investment principal decreases every time there is a loss to stream habitat or pollution. If managed properly a trout stream will be a self-sustaining unit and will be able to produce a surplus of trout each year for the angling public and for future generations.



The Alberta Provincial Parks Division has adopted a new symbol. The circular symbol will be used on all park entrance signs, equipment, buildings and in addition, an embroidered shoulder patch will be worn by park staff on their uniforms. Multi-colored, the symbol depicts the great outdoors . . . clear sky, sun, water, trees and the seeds of new growth.

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